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INFORMAL REPORT

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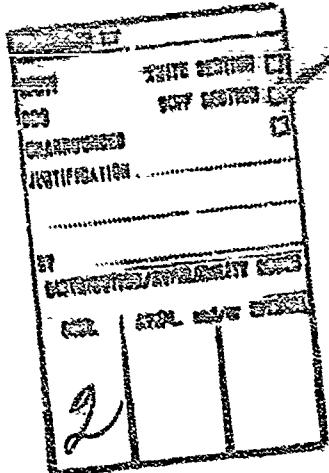
A GUIDE TO THE TECHNICAL LITERATURE OF OCEANOGRAPHY; AN ANNOTATED BIBLIOGRAPHY

MAY 1970

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INFORMAL REPORT

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ABSTRACT

A bibliography of technical oceanographic literature covering the fields of general oceanography, marine biology, marine meteorology, ocean engineering, chemical oceanography, marine geology, and physical oceanography has been compiled and annotated. An attempt has been made to present a representative guide to both the classic literature of oceanography and a selective coverage of the most recent publications in the field.

SUZANNE E. DE CARRE

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GENERAL OCEANOGRAPHY

Abstracts and Indexes

1. The Cambridge Natural History. New York, Macmillan, 1895-1909. 10v.
----- Reprint. Codicots, Eng., Wheldon and Wesley, 1968. 10v.

Covers the animal kingdom as follows: v.1. Protozoa; v.2. Flat Worms. v.3. Mollusks; v.4. Spiders, Mites; v.5. Peripatus Insects. pt. I, Centipedes; v.6. Insects; pt. II; v.7. Balanoglossus; v.8. Amphibia, Reptiles; v.9. Birds; v.10. Mammals. Gives complete descriptions of the animals together with line drawings of many specimens.
2. Current Contents-Physical Sciences. Philadelphia, Institute for Scientific Information. Weekly.

Prints the tables of contents in original format for more than seven hundred foreign and domestic research journals. Covers following disciplines of interest to marine scientists: acoustics, atmospheric sciences, earth sciences, oceanography and physics.
3. Deep-Sea Research Oceanographic Abstracts and Oceanographic Bibliography Section. Salisbury, Pergamon Press. Quarterly.

Divided into two sections: one containing a list of titles and bibliographic references to current papers in oceanography by subject area; the other a group of abstracts of current papers on general oceanography and related subjects.
4. Dissertation Abstracts: The Sciences and Engineering: Abstracts of Dissertations Available on Microfilm or as Xerographic Reproductions. Ann Arbor, Mich., University Microfilms. Monthly.

Presents a compilation of abstracts of doctoral dissertations by broad subject fields. Includes the following fields of interest to oceanographers: biology, geology, hydrology, oceanography, and zoology. Provides subject and author indexes.
5. Fiegel, Lawrence J. Composite Index to Marine Science and Technology. San Diego, Calif., Alfo Pub. Co., 1968. 332 p.

Collates and edits the indexes of thirty selected books in the field of marine science and technology to comprise a brief survey of the field.

6. Marine Science Contents Tables. Rome, Italy, Food and Agricultural Organization of the United Nations. Monthly.

Reproduces the tables of contents of core journals in the marine sciences.

7. Oceanic Index. La Jolla, Calif., Oceanic Research Institute. Nine times per year.

Consists of a Keyalpha Index (a permute subject index), an author index, and the Oceanic Citation Journal with Abstracts. Includes ocean related material from more than two thousand journals in twelve language groups in addition to other oceanic literature such as proceedings of symposia, patents, and government reports.

8. Technical Translations. Springfield, Va., Clearinghouse for Federal Scientific and Technical Information. 1960-1967.

Announced the availability of English translations of scientific and technical literature prepared by government and private sources. Listed bibliographic citations by specific subject groups within general subject fields. Included following general subject fields of interest to the marine scientist: earth sciences and oceanography, navigation, atmospheric sciences, and the biological and medical sciences. Translations are now announced in "U.S. Government Research and Development Reports."

9. U. S. Government Research and Development Reports. Springfield, Va., Clearinghouse for Federal Scientific and Technical Information. Semi-monthly.

Announces U. S. Government-sponsored translations and reports of U. S. Government-sponsored research and development released to the public through the Clearinghouse by the Atomic Energy Commission, National Aeronautics and Space Administration, Department of Defense, and other U. S. Government Departments and agencies. Divided into broad subject categories such as atmospheric sciences, earth sciences and oceanography, navigation, biological sciences, and physics. Includes in a typical entry the title, basic bibliographic information, descriptive terms, and abstract in most cases, the accession number and price. All reports announced in this journal are indexed by subject, personal author, corporate author, contract/grant number, and accession/report number in U.S. Government Research and Development Index.

Bibliographies

10. Catalogs of The Scripps Institution of Oceanography Library. Boston, G.K. Hall and Co., 1969. 4v.

Presents a catalog of literature covering the principle fields of research at Scripps which include marine environment, submarine geology and geochemistry, marine biology, marine physics and geophysics, and other areas of interest to the marine sciences. Includes the author-title catalog, subject catalog, shelf list of documents, reports and translations, and the shelf list.

11. Commissione Internazionale per l'Esplorazione Scientifica del Mare Mediterraneo. Comitato Italiano. Bibliographia Oceanographica. Rome, Organizzazione Poligrafica Industriale, 1928-1956. 29v.

Arranged by subject area and alphabetically by author, contains annotations of the oceanographic literature of the world. Includes the subject areas of the geophysical environment, stocks of marine organisms, effects of environmental changes and damages to and protection of the living resources of the sea, aquaculture, and the utilization of fish products.

12. Forbes, Lynn, comp. Oceanography in Print: A Selected List of Educational Resources. Falmouth, Mass., Town of Falmouth Public Schools, 1968. 58p.

Designed for use by librarians, teachers, and students and divided into categories denoting the level of interest of the reader - elementary, secondary, and adult-technical and non-technical. Further subdivided into the subject interests of marine biology, marine geology, general physical and chemical oceanography, and marine meteorology. Provides a brief annotation and table of contents for each monograph listed.

13. Keehn, Pauline A., comp. Bibliography on Marine Atlases. Washington, American Meteorological Society, 1968. 184p. (American Meteorological Society. Special Bibliographies on Oceanography Contribution no. 6)

Contains both conventional atlases and chart compilations and is arranged in three sections: I. Physical and Chemical Oceanography. II. Marine Meteorology. III. Marine Geology. Provides author and geographic indexes.

14. Keehn, Pauline A., comp. Bibliography on Oceanography of the Tropical Atlantic. Boston, American Meteorological Society, 1967. 87p. (American Meteorological Society. Special Bibliographies on Oceanography Contribution no. 5)

Covers all aspects of oceanography and marine meteorology in the tropical Atlantic, namely physics, dynamics, chemistry,

geology, and biology of the sea, and surface weather and climate. Arranged chronologically and within a year alphabetically by author. Includes an author index.

15. Sinha, Evelyn. Oceanography from Space and Aircraft; State-of-the Art --Technology/Applications. An Annotated Bibliography. La Jolla, Calif., Ocean Engineering Information Service, 1969. 94p. (Ocean Engineering Information Series - Volume 2)

Presents more than four hundred items on the techniques and devices used in remote sensing and the parameters for the applications of remote sensing. Includes techniques and devices of passive and active sensing, transponding buoys and geophysical instrumentation, also the parameters for application of biology, coastal engineering, fisheries, ice surveillance and others.

16. Thompson, Esther, comp. Oceanography, a Report Bibliography. Arlington, Va., U. S. Defense Documentation Center, 1963. 355p.

Contains abstracts in the biological, chemical, economic, physical and geologic fields of oceanography and presents material on the scientific research now being carried out in this discipline.

Directories

17. A Directory of Oceanographers in the United States, 1969. Washington, National Academy of Sciences, 1969. 72p.

Lists more than thirteen hundred scientists having a primary interest in some field of marine science and having published scientific papers in their field during the past several years. Also includes directors of U.S. laboratories devoted primarily to some aspect of marine science.

18. Hydrospace Buyers Guide; A Source Selection Reference of Companies, Government Agencies and Institutions Engaged in Oceanography, Antisubmarine Warfare and General Undersea Research and Development. v.1 +, 1962 + Washington, Data Publications. Biannually.

Provides the address, names of officials and a resume of areas of research and development carried out by the organization.

19. Ocean Master. New Hope, Pa., Charles Kerr Enterprises, Inc., 1969. 542p.

Presents descriptions, specifications, and illustrations of

oceanographic equipment and instrumentation in this catalog of marine equipment.

20. Under Sea Technology; Handbook Directory. 1968 + Arlington, Va., Compass Publications. Annually.

Includes selected technical and scientific reviews and reports on the ocean environment, operations in the sea and resources recovery. Covers industrial firms, hardware, services, oceanographic vessels and submersibles, government organizations, professional and scientific groups, educational institutions and meetings.

21. U. S. National Oceanographic Data Center. Films on Oceanography by Rene P. Cuzon du Rest. Washington, U. S. Naval Oceanographic Data Center., 1969. 99p. (Catalog Series Publication C-4)

Describes the contents of films available in the various areas of oceanography. Gives type of film (size, color, sound, etc.), running time, audience for which intended, where obtainable, and the price.

22. Vetter, Richard C. International Directory of Oceanographers. 4th ed. Washington, National Academy of Sciences, 1964. 273p.

Lists oceanographers who have actively participated in oceanographic programs and by publication in scientific journals. Includes the name of the oceanographer, the country in which he resides, and his oceanographic specialty.

Encyclopedias Dictionaries & Thesauri

23. American Men of Science; A Biographical Directory. The Physical and Biological Sciences. New York, Bowker, 1966. 6v., 2 suppl.

Lists in alphabetical order the biographies of approximately one hundred and thirty thousand men who have distinguished themselves in the physical and biological sciences. Includes their present address, field of specialization, education, and a brief resume of their careers.

24. De Kerchove, Rene, ed. International Maritime Dictionary. 2nd ed. New York, Van Nostrand, 1969. 1023p.

Defines important terms used in seamanship, navigation, marine meteorology, oceanography, maritime and international law, marine insurance and shipping. Gives German and French equivalents for each term.

25. *Enciclopedia General del Mar.* Madrid, Ediciones Garriga, 1957 6v.

Presents in Spanish, signed articles on oceanography, navigation, naval history, meteorology, and many other areas of marine significance. Bibliographies and many illustrations are included with the more significant articles.

26. Fairbridge, Rhodes W., ed. *The Encyclopedia of Oceanography.* New York, Reinhold, 1966. 1021p.

Consists of two hundred and forty five articles on all phases of oceanography with a bibliography given with each article. Embraces a broad range of subjects including the topography of the ocean floor, the mining and farming of the seas, abyssal trenches, and strange forms of life found in the ocean.

27. Firth, Frank E., ed., *Encyclopedia of Marine Resources.* New York, Reinhold, 1969. 740p.

Presents articles with bibliographies on the most significant aspects of ocean's resources, together with a few closely related topics. Includes material on desalinization of sea water, the use of desalinized water to irrigate the world's deserts, aquaculture, and the nutrient possibilities of fish protein concentrates.

28. Hunt, Lee M. and Donald G. Groves. *A Glossary of Ocean Science and Undersea Technology Terms.* Arlington, Va., Compass Publications, 1965. 173p.

Presents a compilation of the definitions of over 3500 engineering and scientific terms used in the field of underwater sound, oceanography, marine sciences, underwater physiology, and ocean engineering.

29. Huxley, Anthony J. *Standard Encyclopedia of the World's Oceans and Islands.* New York, Putnam, 1962. 382p.

Presents descriptive articles outlining the history, physical features, and other points of geographical interest. Includes a gazeteer, reference maps, and a comprehensive index.

30. Runcorn, S. K. and others, ed. *International Dictionary of Geophysics; Seismology, Geomagnetism, Aeronomy, Oceanography, Geodesy, Gravity, Marine Geophysics, Meteorology, the Earth as a Planet and Its Evolution.* New York, Pergamon, 1967. 3v.

Consists of concise articles in the various disciplines of

geophysics by specialists in these areas. Provides a bibliography at the end of each article.

31. U. S. Department of the Interior. Water Resources Thesaurus; a Vocabulary for Indexing and Retrieving the Literature of Water Resources Research and Development. Washington, Government Printing Office, 1966. 237p.

Encompasses research areas in the field of water resources such as the hydrological cycle, supply and demand for water, methods of increasing the supply, and the engineering, recreational, biological, and ecological aspects of water problems.

32. U. S. Naval Oceanographic Office. Glossary of Oceanographic Terms. Washington, Government Printing Office, 1966. 204p. (U.S. Naval Oceanographic Office, Special Publication SP-35)

Provides definitions of technical terms used in oceanography and other marine sciences. Presents the current and past usage in the marine aspects of physics, chemistry, biology, geology, geophysics, geography, mathematics, and meteorology.

Handbooks

33. U. S. Naval Oceanographic Office. Handbook of Oceanographic Tables, compiled by Eugene L. Bialek. Washington, Government Printing Office, 1966. 427p. (U.S. Naval Oceanographic Office Special Publication SP-68)

Supplies the oceanographer and oceanographic engineer with a reference covering many aspects of oceanography. Divided into four sections: I. General Mensuration Information Related to the Oceans. II. Data on Oceans Not Related to Geography. III. Data on Oceans Related to Geography. IV. Tables for Computations and Conversions.

Monographs

34. Alexander, Lewis M. ed. The Law of the Sea: The Future of the Seas Resources: Proceedings of the Second Annual Conference of the Law of the Sea Institute, June 26-29, 1967. Kingston, R. I., The University of Rhode Island, 1968. 155p.

Includes following topics: I. The Needs for Rules and Rights in the Use of the Sea. II. Existing Fisheries Arrangements, and Their Implications. III. Conflicts of Uses of the Sea. IV. Alternate Regimes for the Sea. V. Future Development of World Fisheries.

35. Alexander, Lewis M. ed. The Law of the Sea: International Rules and Organization for the Sea. Proceedings of a Third Annual Conference of the Law of the Sea Institute, June 24-27, 1968, University of Rhode Island, Kingston, Rhode Island. Kingston, R. I., University of Rhode Island Press, 1969. 464p.

Includes following topics: I. Emerging Problems of the Continental Shelf. II. The Use of the Sea Beyond National Interest. III. Alternatives for International Organization.

36. Alexander, Lewis M., ed. The Law of the Sea: Offshore Boundaries and Zones. Columbus, Ohio, The Ohio State University Press, 1967. 321p.

Presents proceedings of the first conference of the Law of the Sea Institute which discussed ideas on matters relating to the use and control of the sea. Includes following topics: I. International Law and the Law of the Sea. II. Offshore Claims of the World. III. Mining in the Sea. IV. International Regulation of Communications for Oceanographic Equipment.

37. American Geographical Society of New York. Serial Atlas of the Marine Environment. New York, American Geographical Society of New York. 1962 +. 18v +. Irregularly.

Covers various phases of the marine environment in folio format. Includes following topics: I. North Atlantic Temperature at a Depth of 200 Meters. II. Meteorology of the North Sea. III. North American Sea Stars. IV. Distribution of the North Atlantic Pelagic Birds.

38. Badgley, Peter C. and others. Oceans from Space. Houston, Gulf Publishing Co., 1970. 234p.

Presents proceedings of a symposium on the status of knowledge, critical research needs, and potential research facilities relating to the study of the oceans from space. Includes research papers on remote sensing and interpretation of sea-ice features, implications of space research to fishery development, and the potential application of remote sensing to selected ocean circulation problems.

39. Barnes, Harold ed. Oceanography and Marine Biology. London, George Allen & Unwin, Ltd., 1963 +. v.1 +. Annually

Emphasizes the basic aspects of all branches of oceanography including marine biology. Deals with subjects of special or topical importance and reports on new aspects in these marine

sciences as they arise.

40. The Carlsberg Foundation's Oceanographical Expedition Round the World 1928-30 and Previous "Dana" Expeditions under the Leadership of the Late Professor Johannes Schmidt. Dana Reports. Copenhagen, Andr. Fred Høst & Son, 1934 +. Report no. 1 +. Irregularly

Presents research, particularly in biological and physical oceanography, carried out during various oceanographic cruises of "Dana" and "Dana II" in the Atlantic, Indian, and Pacific Oceans.

41. Cotter, Charles H. The Physical Geography of the Oceans. New York, American Elsevier, 1965. 317p.

Emphasizes the chemical, physical, and geological aspects of the oceans with very little material on the marine life in the sea. Includes Chapters on the instruments of the science of the sea and the history of oceanography.

42. Dietrich, Gunter. General Oceanography: An Introduction, Translated from the German by Feodor Ostanoff. New York, Interscience, 1963. 588p.

Covers the geomorphology of the ocean bottom, oceanographic instruments and observational methods, theory of ocean currents, the biochemistry of the ocean and related topics.

43. Great Britain. Challenger Office...Report on the Scientific Results of the Voyage of H.M.S. Challenger during the Years 1873-76 under the Command of Captain George S. Nares...and the Late Captain Frank Toulle Thomson, R.N. Prepared under the Superintendence of the Late Sir C. Wyville Thomson...and Now of John Murray... Published by Order of Her Majesty's Government. Edinburgh, Printed for H. M. Stationery Office by Neill and Company, 1880-95. 40v. in 44. ----- Reprint. New York, Johnson Reprint Corp., 1965. 50v.

Presents reports of the first of the great deep-sea expeditions which carried out a comprehensive oceanographic survey through the Atlantic, Pacific and Indian Oceans between 1872 and 1876. The scientific results of this expedition form the foundation of our knowledge of the physical, chemical, bathymetric, geological, and biological conditions of the deep oceans.

44. Great Britain. Colonial Office. Discovery Reports Issued by the Discovery Committee, Colonial Office, London on Behalf of the

Government of the Dependencies of the Falkland Islands.
Cambridge, England, Cambridge University Press, 1929 +. v.1 +.
Irregularly

Reports research gathered during cruises of oceanographic survey ships in the Antarctic and Indian Oceans particularly in the fields of marine biology and physical oceanography.

45. Herdman, William A. *Founders of Oceanography and Their Work: An Introduction to the Science of the Sea.* London, Edward Arnold & Co., 1923. 340p.

Presents in first half of book the biographies of some of the founders of modern oceanography such as C. Wyville Thomson, Louis and Alexander Agassiz, and Sir John Murray. Second half deals with such topics as ocean currents, coral reefs, and the sea-fisheries of the 1920's.

46. King, Cuchalaine A. M. *An Introduction to Oceanography.* New York, McGraw-Hill, 1963. 352p.

Presents an outline of the origin and pattern of major ocean basins and changes in sea level during recent geological time. Discusses the shape of the ocean floor, ocean water temperature and salinity, the major water masses, oceanic circulation and marine biology.

47. Lewis, Charles Lee. *Matthew Fontaine Maury: The Pathfinder of the Seas.* Annapolis, The United States Naval Institute, 1927. 264p.

Presents a general view of the career of Matthew F. Maury, one of the first modern oceanographers and founder of the U. S. Naval Oceanographic Office. Emphasizes his astronomical work, his wind and current charts, and his physical geography of the sea with lesser consideration given to Maury's life.

48. Maury, Matthew F. *The Physical Geography of the Sea.* New York, Harper and Brothers, 1855. 274p. ----- Reprint. Harvard University Press, 1963. 432p.

Records the facts known about the sea as they were known in 1855. The results of his research and theories about the phenomena of the sea has come to be recognized as the first textbook of modern oceanog

49. Murray, John and Johan Hjort. *The Depths of the Ocean. A General Account of the Modern Science of Oceanography Based Largely on the Scientific Researches of the Norwegian Seaman "Michael Sars" in*

the North Atlantic. London, Macmillan, 1912. 812p.

Reviews the work and cruises of the "Michael Sars" and includes Chapter on pelagic plant life, invertebrate bottom fauna of the Norwegian Sea & North Atlantic, and fishes from the sea bottom.

50. Padelford, Norman J. Public Policy and the Use of the Seas. Cambridge, Mass., Massachusetts Institute of Technology Press, 1968. 361p.

Studies the issues associated with increased utilization of the marine environment. Contains Chapters on new goals for national policy, territorial waters and contiguous zone, the continental shelf, the seas and international law, the living and mineral resources of the seas, pollution of waters and the political process and the future of national ocean policy.

51. Readings in the Earth Sciences. San Francisco, W. H. Freeman and Co., 1969. 2v. (Scientific American Resource Library)

Reproduces selected articles in the earth sciences which have appeared in the Scientific American during the past twenty years. Covers a range of topics from the interior of the earth to the land of the Antarctic, from the origin of hurricanes to the coelacanth, and from corals as paleontological clocks to the general circulation of the atmosphere.

52. Sears, Mary, ed. Progress in Oceanography. New York, Macmillan Co., 1963 +. v.1 +. Annual

Presents papers which report original research with wide appeal, other which review the status of certain fundamental problems and still others which are preliminary in nature but describe new methods or approaches.

53. Sverdrup, H.U. and others. The Oceans, Their Physics, Chemistry and General Biology. New York, Prentice-Hall, 1946. 1087p.

Studies comprehensively all phases of oceanography and is considered to be one of the basic tools of oceanographers. Presents a technical treatment which should be supplemented by a study of modern developments in the field.

54. U. S. Commission on Marine Science Engineering, and Resources. Our Nation and the Sea; A Plan for National Action. Washington, Government Printing Office, 1969. 305p.

Gives a report of the investigation of marine problems facing the United States ranging from the preservation of our coastal

shores and estuaries to the more effective use of the resources which lie within and below the sea. Makes a recommendation for a National Oceanic and Atmospheric Agency.

55. U. S. Committee on Marine Research, Education and Facilities. Oceanographic Ship Operating Schedules for FY 1962 +. Washington, D.C., 1961 +. Annual

Provides a physical description and other operating characteristics for each government owned or sponsored oceanographic vessel operating during the next six months. Reports the area of operation, type of work, space for visiting scientists, chief scientist, and cruise period for each vessel.

56. U. S. Interagency Committee on Oceanography. University Curricula in the Marine Sciences and Related Fields. Washington, 1962/63 +. Annual

Summarizes the facilities and curricula of institutions offering degrees and courses in the marine sciences, ocean engineering and marine technology. Describes the content of the courses being offered and outlines typical requirements for undergraduate preparation, leading to graduate studies. Gives a brief resume of the research facilities in each of the educational institutions covered.

57. Williams, Jerome and others. Sea and Air: the Naval Environment. Annapolis, U. S. Naval Institute, 1968. 329p.

Considers the atmosphere and the sea as a single fluid environment, covering the study of similar phenomena of the two fluids together whenever possible. Discusses the salient features of both the atmosphere and the oceans, treating them in such a manner that the various characteristics of each may readily be compared and contrasted.

58. Woods Hole Oceanographic Institution. Oceanography from Space. Woods Hole, Mass. Woods Hole Oceanographic Institution, 1965. 469p. (Woods Hole Oceanographic Institution Ref. no. 65-10)

Assesses the uses of earth-orbiting vehicles for the rapid scanning of the ocean. Presents papers by a representative cross-section of oceanographers which report the results of work on ocean currents, the shape of the earth, identification of water masses, marine biology, sea ice, sea state, and coastal geography, geology and engineering.

Periodicals

59. Bulletin of Marine Science. Coral Gables, Fla., University of Miami Press. Quarterly
Deals with investigations in the marine sciences with preference given to work relating to tropical and subtropical waters.

60. Deep-Sea Research. Long Island City, N. Y., Pergamon Press. Bi-monthly
Reports the results of original scientific research, the solution of some instrumental problem or some new laboratory method in the physical, biological, chemical, or geological aspect of oceanography.

61. Journal du Conseil. Charlottelund Slot, Denmark, Conseil Permanent International pour L'Exploration de la Mer. 3 numbers per year.
Emphasizes original research papers in marine biology and chemical oceanography. Publisher reports in French, German and Spanish, although most of them are in English. A synopsis in English accompanies each article in another language.

62. Journal of Geophysical Research; Oceans and Atmospheres. Richmond, Va., The American Geophysical Union. Quarterly
Contains research papers on the physics and chemistry of the atmosphere, the air-sea interface, the oceans, and ocean basins.

63. Journal of Marine Research. New Haven, Conn., Sears Foundation for Marine Research. Irregular
Publishes short articles, occasionally longer ones, either theoretical or descriptive, dealing with any investigation pertaining directly or indirectly to problems of the sea.

64. Journal of Maritime Law and Commerce. Silver Spring, Md., Jefferson Law Book Co. Quarterly
Covers legal aspects relating to maritime problems, such as the jurisdiction of the seabed and ocean floor, mining on the continental shelf, and liability for oil pollution damage. Includes notes on recent cases, book reviews, selected current bibliography with annotations and drafts of proposed maritime treaties and conventions.

65. Limnology and Oceanography. Lawrence, Kan., The American Society of Limnology and Oceanography, Inc. Bi-monthly

Publishes original research papers based on research in any aspect of oceanography or limnology, the scientific study of the biological, geographical and physical features of fresh-water, particularly lakes and ponds.

66. Natural Resources Lawyer. Journal of the Sections of Natural Resources Law, American Bar Association. Chicago, Ill., American Bar Association. Monthly

Presents articles on the aspects of law relating to the natural resources of this country including its forest resources, mineral resources, and resources of the marine environment of the continental shelf and beyond.

67. The Oceanographical Magazine. Tokyo, Japan, Japanese Meteorological Agency. Irregular

Reports research, observational data and oceanographical cruise summaries, relating to the waters of the North Pacific Ocean particularly those surrounding Japan. Deals with all phases of oceanography, including marine biology, physical oceanography, and marine meteorology.

68. Oceanology of the Academy of Sciences of the U.S.S.R. Washington, The American Geophysical Union. Bi-monthly (Translated by Scripta Technica, Inc.)

Translated the leading Russian oceanographic journal containing original research articles in physical, chemical, geological, and biological oceanography. Includes sections on methods and instruments, short items on both Russian and foreign oceanography, and biographical information on Russian and foreign marine scientists.

69. Oceans. San Diego, Calif., Trident Publishers, Inc. Monthly

Provides coverage in non-technical form of all aspects of the oceans, including oceanography, hydrography, and ocean engineering. Features articles on historical figures and events in maritime history, its ecology, conservation, geopolitics, marine creatures, careers in oceanography and financial investments in oceanography.

70. Remote Sensing of the Environment. New York, American Elsevier Publishing Co. Quarterly

Publishes papers of both research and exposition dealing with the use of remote sensor images and other remotely sensed data for scientific and practical applications in geography and cartography,

geology and mineral resources, hydrology and water supplies and meteorology and oceanography.

71. *Sea Frontiers*; Magazine of the International Oceanographic Foundation. Miami, Fla., International Oceanographic Foundation. Bi-monthly

Reviews non-technically the scientific study and exploration of the oceans, including the study of game fishes, food fishes, ocean currents, and the geology, chemistry, and physics of the sea and the sea floor.

72. *Tellus*; a Bi-Monthly Journal of Geophysics. Stockholm, Sweden, Svenska Geofysika Foreningen. Bi-monthly

Publishes original contributions, survey articles, and discussions in the field of the geophysical sciences. Articles in the fields of physical and chemical oceanography, hydrography, and marine meteorology are of most value to the marine scientist.

MARINE BIOLOGY

Abstracts and Indexes

73. Aquatic Biology Abstracts. New York, CCM Information Corp. Monthly

Gives full bibliographic information with each abstract, including author addresses with about 7000 abstracts indexed annually. Covers scientific literature relating to algae, bacteria, aquatic flora, fauna, plankton, fish marine ecology and both fresh water and marine pollution.

74. Biological Abstracts. Philadelphia, Biological Abstracts. Semi-monthly

Arranged by broad subject with taxonomic index and an author index in the first part and covers literature in all areas of botany and zoology including all phases of marine botany and zoology. Gives complete bibliographic information together with an abstract for each entry. In the second part, known as B.A.S.I.C. (Biological Abstracts Subjects in Context) Subject Index, Indexes all key words of the title in a computer-based KWIC index. Issues annually cumulative indexes to each volume including author, taxonomic, and KWIC.

75. Commercial Fisheries Abstracts. Seattle, Washington, Bureau of Commercial Fisheries. Monthly

Emphasizes fish, their nutritional properties, fisheries and their economic aspects and other material of value to commercial fisherman. Printed in the form of catalog cards which may be cut out and filed. Includes in each entry the title, basic bibliographic information, descriptive subject headings, and abstract of the material.

76. Current Bibliography for Aquatic Sciences and Fisheries. London, Eng., Taylor and Francis Ltd. 2 sections per year

Classified according to broad subject areas which include general material (oceanography, limnology, and fisheries), plankton, benthos, and aquatic stocks. Provides geographic, author, and subject indexes.

77. Current Contents-Life Sciences. Philadelphia, Pa., Institute for Scientific Information. Weekly

Prints tables of Contents in original format for more than

nine hundred foreign and domestic research journals. Included among the life sciences of interest to marine biologists are animal and plant science, biology, zoology, ecology, and drug research.

78. *World Fisheries Abstracts: A Quarterly Review of Technical Literature on Fisheries and Related Industries.* Rome, Italy, Food & Agriculture Organization. Quarterly

Gives coverage of U. S. and foreign journals of interest to the fishing industry and commercial fisherman. Printed on standard size catalog cards and provides author and subject indexes for each issue.

Bibliographies

79. *Dean, Bashford. A Bibliography of Fishes.* Enlarged and edited by Charles Rochester Eastman. New York, Russell & Russell, Inc., 1962. 3v.

Brings together all printed references to the science of fishes, covering their habits, structure, development, physiology, pathology, distribution, and kinds. Groups all titles under the headings of authors in first two volumes and under subject in third volume.

80. *Dictionary Catalog of the Department Library, United States Department of the Interior (Washington, D.C.).* Boston, G. K. Hall & Co., 1967. 37v.

Catalogs the largest collection in the U. S. on mines, minerals, petroleum, and coal as well as a good working collection on geology. Also includes an excellent collection in the field of fish, fisheries and wildlife.

81. *Harvard University. Catalogue of the Library of the Museum of Comparative Zoology.* Boston, G. K. Hall and Co., 1968. 8v.

Gives a valuable description of the museum's library collection in the field of ichthyology, herpetology, malacology, marine invertebrates, vertebrate and invertebrate paleontology, and related subjects.

82. *International Catalogue of Scientific Literature. Section L. General Biology, 1901-1914.* London, The Royal Society, 1902-1915. 14v.
----- Reprint. New York, Johnson Reprint Corp., 1968. 1v.

Presents bibliography of papers, books in serials, and independent works in the field of biology, including marine biology. Contains

schedules and indexes in four languages, an author catalog and a subject catalog.

83. International Catalogue of Scientific Literature. Section N. Zoology. 1901-1914. London, The Royal Society, 1902-1915. 14v. Reprint. New York, Johnson Reprint Corp., 1968. 5v.

Presents a bibliography of papers and books in serials and independent works in the field of zoology. Contains schedules and indexes in four languages, an author catalog and a subject catalog.

84. Smith, Roger Cletus. Guide to the Literature of the Zoological Sciences. 6th ed. Minneapolis, Burgess, 1962. 232p.

Summarizes material on the bibliographies of the zoological sciences and other reference materials, abstract journals, taxonomic indexes and literature, and forms of bibliographies and literature.

Dictionaries Encyclopedias & Thesauri

85. Dumbleton, C. W., ed. Russian-English Biological Dictionary. New York, Consultants Bureau, 1964. 512p.

Draws terms from numerous Russian Textbooks, monographs, research papers, and journal articles. Includes some obsolete terms, particularly those connected with discarded biological theories. Gives the Russian term, then its English equivalent, and, if applicable, the Latin scientific name.

86. Encyclopedia of the Life Sciences. New York, Doubleday, 1964-1965. 6v.

Presents general articles covering the whole field of biology. The six volumes are: v.1. The Living Organisms; v.2. The Animal World; v.3. The World of Plants; v.4. The World of Microbes; v.5. The Human Machine: Mechanisms; v.6. The Human Machine: Disorders.

87. Gray, Peter. The Dictionary of the Biological Sciences. New York, Reinhold, 1967. 602p.

Defines terms used by English-speaking peoples in the description of organisms, their anatomy, function, and mutual interaction in addition to those terms denoting taxa of ordinal rank and above and the majorities of families. Groups together words derived from identical roots or developed from a same noun in the thesauric form of entry.

88. Gray, Peter. *Encyclopedia of the Biological Sciences*. New York, Reinhold, 1961. 1119p.

Covers the broad field of the biological sciences in an alphabetical arrangement by means of articles signed by recognized biologists. Includes bibliographies for most articles and is written for the non-specialist although some highly technical articles are presented.

89. Leftwich, A. W. *A Dictionary of Zoology*. New York, Van Nostrand, 1963. 319p.

Gives a detailed and unambiguous definition for general terms in common use although a familiarity with biological terms is assumed. Includes definitions of all principle phyla and classes of animals as well as a large number of orders, sub-orders and families.

90. *Nomenclator Zoologicus: A List of the Names of the Genera and Subgenera in Zoology from the Tenth Edition of Linnaeus, 1758, to the end of 1935*. London, The Zoological Society of London, 1939. 4v.

Attempts to give as complete as possible bibliographic origin of the name of each genus and subgenus in zoology that has been published from 1758 up to 1935. Does not contain the names to be found in works which have been excluded by the International Zoological Nomenclature nor does it include clearly hypothetical ones.

91. U. S. Department of Agriculture. *Agricultural/Biological Vocabulary*. Washington, Government Printing Office 1967. 2v.

Designed to provide access to published and unpublished research reports, by manual or automated methods by means of a thesaurus-type listing. Includes the categories of animal science, chemistry, physical and biological sciences (auxiliary), social sciences (auxiliary) and reference materials which may be of interest to the marine scientist.

Directories

92. American Institute of Biological Sciences. *Directory of Bio-science Departments in the United States and Canada*. New York, Reinhold, 1967. 672p.

Consists of three sections. Section I. Descriptions, alphabetically by State, of Bio-Science Departments of Degree-granting

Institutions. Section II. Listing, Alphabetically by State, of Institutions Offering Less than a Major in a Bio-Science. Section III. Alphabetical Listing of Faculty Members in the Degree-granting Departments.

93. Frey, Hans. *The Illustrated Dictionary of Tropical Fishes*. Jersey City, N. J., T.F.H. Publications, 1961. 768p.

Translated from the German, defines terms of tropical fish-keeping for both coldwater and marine aquaria. Covers breeding, feeding, illnesses, and proper aquarium management. Gives nomenclature for fish anatomy, biology, ecology, and physiology together with a description of aquatic plants.

94. George Washington University. Biological Sciences Communications Project. *Aquatic Biologists of the World and Their Laboratories*. Parts I and II. Washington, George Washington University, 1964. 2v.

Contains in the first section a list of laboratories, stations, and institutions whose major interest lies in aquatic biology, in the second an alphabetical listing of individuals so far identified with their location and their research interests, and in the third a permuted index to the research indicated in the second.

95. Hiatt, Robert W. *World Directory of Hydrobiological and Fisheries Institutions*. Washington, American Institute of Biological Science. 1963. 320p.

Describes on a world-wide basis, existing facilities, together with the scope of their activities in research and instruction in the marine and fresh-water biological sciences. Also includes museums having extensive exhibits in aquatic biology, mostly from a taxonomic standpoint.

Handbooks

96. Axelrod, Herbert R. and Cliff W. Emmens. *Exotic Marine Fishes*. Jersey City, T.F.H. Publications, 1969. 1v.

Outlines the management of marine fishes in a saltwater aquarium, their feeding, and their diseases. Illustrates many marine species, such as anemone fishes, batfishes, scorpionfishes, and squirrel fishes and describes their range, habits, color variations, strains, and breeding habits.

97. Innes, William T. *Exotic Aquarium Fishes. A Work of General Reference*.

19th ed. rev. Maywood, N. J., Aquariums, Inc., 1966. 593p.

Presents the general principles of good aquarium management, including a description of suitable aquatic plants, feeding, diseases and their remedies, and the construction of both fresh water and marine aquariums. Discusses the classification of fishes, the pronunciation of names and the breeding of egg-scatterers, live-bearers, the bubble-nest builders, and the cichlids.

Monographs

98. Andersen, Harald T. The Biology of Marine Mammals. New York, Academic Press, 1969. 511p.

Emphasizes the functional adaptations of swimming and diving in an aquatic habitat on the vital organs of marine mammals. Discusses the hydrodynamics of swimming and wave-riding dolphins, the echolocation of marine mammals, the nervous system of the cetacea, and marine mammal communications.

99. Arnold, Augusta Foote, The Sea-Beach at Ebb-Tide; a Guide to the Study of the Lower Animal Life Found between Tide-Marks. New York, The Century Co. 1901. 490p. ----- Reprint. New York, Dover Publications, Inc. 1968. 490p.

Surveys the most conspicuous and important algae and invertebrates that are found in the littoral areas of the eastern, southern, and western coasts of North America. Includes descriptions of the size, shape, color, rarity, structure, habits and other identifying characteristics of individual species.

100. Baslow, Morris H. Marine Pharmacology; A Study of Toxins and Other Biologically Active Substances of Marine Origin. Baltimore, Williams and Wilkins, 1969. 286p.

Offers results of investigations into the pharmacological potentials of Compounds derived from marine organisms.

101. Boolootian, Richard A. ed. Physiology of the Echinodermata. New York, Interscience, 1966. 822p.

Surveys comprehensively the field of the echinodermata. Presents papers by thirty one specialists on the biology, ecology, physiology of the echinoderm phylum in which are included sea stars, sea lilies, sea cucumbers, and sea urchins.

102. Bohlke, James E. and Charles C. G. Chaplin. Fishes of the Bahamas and

Adjacent Tropical Waters. Wynnewood, Pa., Livingston Publishing Co., 1968. 771p.

Describes fishes living at or shallower than the dropoff to deep water at the edges of the banks or those that are within the depth range of a diver using scuba. Classifies them according to family and gives a physical description, distinctions, coloration, and distribution together with an illustration of the individual fish.

103. Borradaile, Lancelot A. and others. The Invertebrata: A Manual for the Use of Students. 4th ed. Cambridge, Eng., at the University Press, 1961. 820p.

Divides the invertebrata in which kingdom many of the marine belong into its taxonomic classifications and presents the characteristic features of each of these classifications with a detailed statement and discussion of matters of importance or interest concerning them. Gives in the final Chapter an orientation to the key works in the field of zoological literature.

104. Brodal, Alf and Ragnar Fange, ed. The Biology of Myxine. Oslo, Universitetsforlaget, 1963. 588p.

Presents a comprehensive discussion of the biology of the hagfish (lamprey eel), the most primitive living vertebrate. In a series of papers describes the anatomy of the hagfish and gives new observations and their interpretation of the most recent research.

105. Buchsbaum, Ralph & Lorus J. Milne. The Lower Animals; Living Invertebrates of the World. Garden City, N. J., Doubleday, 1960. 303p.

Discusses the external appearance of invertebrates (excluding insects), both through text and illustrations, their habits, their environmental adaptations, and a few of the ways they enter into human lives. Some of the more common marine invertebrates described include starfish, clams, crabs, corals, sponges, and giant squids, and some of the less familiar members include the arrow worms, the moss animals, the comb jellies, and the sea squirts.

106. Dawson, E. Yale. Marine Botany: An Introduction. New York, Holt, Rinehart and Winston, 1966. 371p.

Emphasizes the benthic algae, but also examines the other major groups of marine plants: The bacteria, fungi phytoplankton, and sea grasses among others. Treats the physiology, ecology, phytogeography of the marine algae, history of phycology, and economic uses of maritime plants.

107. Gilbert, Perry W. and others, eds. *Sharks, Skates and Rays*. Baltimore, Johns Hopkins, 1967. 624p.

Presents a comprehensive up-to-date compendium of papers written by leading elasmobranch biologists. Includes the topics of social organization of shark population, the teeth of sharks, dark adaptation, and immunochemistry.

108. Halstead, Bruce W. *Poisonous and Venomous Marine Animals of the World*. Washington, Government Printing Office, 1965 + 2v. +.

Provides an arrangement of marine animals by phylum, class, and family utilizing a historical approach which gives a systematically organized source of data on marine biotoxicology covering the total world literature. Volume one describes the invertebrates, and volume two the vertebrates.

109. Hardy, Alister. *The Open Sea: Its Natural History*. Boston, Houghton, Mifflin Co., 1965. 1v.

Discusses the natural history of fish with the latest scientific discoveries about the life of important commercial species, such as herring, cod, and plaice in particular. Part I. The World of Plankton describes the plankton of the seas set in its pattern of community, climate, sea-scene, and season. Part II. Fish and Fisheries.

110. Herald, Earl Stannard. *Living Fishes of the World*. Garden City, N. Y., Doubleday, 1961. 303p.

Outlines the habits, range, feeding and life cycles of the fishes of the oceans, lakes, and streams. Deals also with the economic value of many species, their edibility, the favorite species of sports fishermen and of tropical fish fanciers, and the chain of dependence in which the larger feed on the smaller.

111. Hoar, W. S. and David J. Randall. *Fish Physiology*. New York, Academic, 1969. 3v.

Covers in the first volume the excretion, ionic regulation and metabolism of fish, the endocrine system in the second, and in the third, the reproduction and growth, the bioluminescence, also the pigments and poisons of fish.

112. Idyll, C. P. *Abyss*. *The Deep Sea and the Creatures that Live in It*. New York, Crowell, 1964. 396p.

Examines the physical, chemical, and dynamic characteristics of

the deep sea environment beyond the continental shelves. Describes and illustrates the bizarre marine creatures and plants which inhabit it.

113. Kriss, Anatoli E. and others. *Microbial Population of Oceans and Seas.* New York, St. Martin's Press, 1967. 287p.

Gives a synoptic picture of the distribution of marine microorganisms from the high seas together with their density, biochemical activity and range in various geographical zones of the oceans and seas in an extensive microbiological survey of the oceans.

114. *Marine Bioacoustics*, edited by William N. Tavolga. New York, Pergamon, 1964 +. Annual

Presents the proceedings of symposia which are concerned with the simulation problems of marine animal sound characteristics.

Examines the sounds of fishes, invertebrates, and marine mammals and discusses the results of these investigations.

115. Marine Technology Society. *Drugs from the Sea; Transactions of the Drugs from the Sea Symposium, University of Rhode Island, 27-29 August 1967*, edited by Hugo D. Freudenthal. Washington, Marine Technology Society, 1968. 297p.

Outlines in a series of paper the progress made in the search for marine plants, animals, and microorganisms that can be useful as drugs, drug vehicles, demulcents, and nutritional supplements.

Covers in addition research on harmful chemicals found in marine organisms.

116. Marshall, Norman B. *Aspects of Deep Sea Biology.* London, Hutchinson's Scientific and Technical Publications, 1954, 380p.

Discusses the deep sea environment including deep sea food chains, the adaptation of animal life to the great pressures and means of exploring this environment. Gives life histories of marine life at this depth and reviews some aspects of marine biogeography.

117. Marshall, Norman B. *The Life of Fishes.* Cleveland, World Publishing Co., 1966. 402p.

Deals with the physiology, ecology, and other physical characteristics of fishes. Begins with chapters on the anatomy, function, and adaptation of fishes, followed by Chapters on camouflage, and behavioral aspects and concludes with Chapters on reproduction and early life, and the adaptation of fishes to shallow and deepwater ocean habitats and freshwater habitats.

118. Marshall, Thomas C. *Fishes of the Great Barrier Reef and Coastal waters of Queensland*. Narbeth, Pa., Livingston Publishing Co., 1965. 566p.

Brings together the detailed descriptions in non-technical terminology of most of the known species of fishes which inhabit the Great Barrier Reef of Queensland. Covers the class, Elasmobranchii, including sharks, rays and ghost sharks and the class Pisces including fishes.

119. Moore, H. B. *Marine Ecology*. New York, Wiley, 1958. 496p.

Discusses the physical, chemical, and biological environments relating to marine life. Relates the various types of oceanic habitats, such as the sea bottom, the coral reef, rocky shores, and estuaries to the lives and habits of the organisms dwelling in them.

120. Norris, Kenneth S., ed. *Whales, Dolphins and Porpoises*. Berkeley, University of California Press, 1966. 789p.

Summarizes a wide range of modern investigations into the Cetacea. Among the topics presented are systematics, distribution, anatomy, physiology, communications, echolocation and recognition.

121. Nicol, Joseph A. C. *Biology of Marine Animals*. 2nd. ed. New York, Wiley, 1967. 699p.

Emphasizes the physiological functions of the organisms living in the sea. Examines the circulation, respiration, nutrition, pigmentation, and bioluminescence of marine animals.

122. Oppenheimer, Carl H.; comp. and ed. *Symposium on Marine Microbiology*. Springfield, Illinois., Charles C. Thomas, 1963. 769p.

Brings together recent research results and investigations into problems of current concern in the field of marine microbiology. Presents papers on the geomicrobiological activities of marine microorganisms, the ecology of algae, protozoa, fungi and viruses, heterotrophy of marine microbiology and the distribution and function of marine bacteria.

123. Raymont, J. E. G. *Plankton and Productivity in the Oceans*. New York, Pergamon, 1968. 600p.

Reviews the basic considerations involved in marine primary production and provides an introduction to aspects of the physical and chemical environment of the seas which are of major importance in influencing primary production.

124. Ricketts, Edward F. and Jack Calvin. Between Pacific Tides. Rev. by Joel W. Hedgpeth. 4th ed. Stanford, Calif., Stanford University Press, 1968. 614p.

Explores the ecology of the marine invertebrates of the Pacific Coast in various types of coastal habitats, such as the protected outer coast, the open coast, and the bays and estuaries. Concludes with an annotated systematic taxonomic index and a general bibliography.

125. Russell, Frederick S., ed. Advances in Marine Biology. New York, Academic Press, 1963 +. Annual

Reviews current research in such topics of marine biological interest as the physiology, microbiology, ecology, diseases, and propagation of marine life.

126. Schmitt, Waldo L. Crustaceans. Ann Arbor, Mich., University of Michigan Press, 1965. 204p.

Covers the history of man's involvement with the crustaceans, their variety of form, habits and special ways of life, and the role of the crustaceans in the sea. Explores their usefulness to man and their occasional detriments to him.

127. Waterman, Talbert H. The Physiology of Crustacea. New York, Academic, 1960. 2v.

Treats the functional physiological systems of crustacea in volume one, "Metabolism and Growth." In volume two, "Sense Organs, Integration, and Behavior," reviews these three components of self regulation and analyzes the behavior which emerges therefrom.

128. Wheeler, Alwyne. The Fishes of the British Isles and North West Europe. East Lansing, Mich., Michigan State University Press, 1969. 613p.

Identifies all the marine and freshwater fish in and around Northern Europe. Classifies fishes into natural groups and gives identification keys and distribution maps for the different species.

129. Wilbur, Karl M. and C. M. Yonge, ed. Physiology of Mollusca. New York, Academic, 1964. 2v.

Summarizes the literature on the main features of the physiology of molluscs. Includes, in addition, to the usual subdivisions found in physiological treatises, chapters on the physiological

aspects of development with ecology in the sea, in freshwaters, and on land, and with the behavior and learning in those mostly highly evolved molluscs, the cephalopoda.

130. Wimpenny, R. S. *The Plankton of the Sea*. New York, Elsevier, 1966. 426p.

Describes the interrelations, distribution, and behavior of planktonic animals and plants upon which the rest of marine life, including commercial fish and whales depend for food. Concludes with its potential use in providing food for man, and the effect of climate and water movements on the way the organism adapts itself.

131. Wood, E. J. Ferguson. *Microbiology of Oceans and Estuaries*. New York, Elsevier, 1967. 319p.

Presents a brief resume of many aspects of the marine microbiological world and outlines the modern trends of thought regarding the many activities of microorganisms in physical and chemical phenomena in the seas of the world. Considers the economic implications of marine microbiology and its importance in the food web of the seas.

132. Woods Hole Oceanographic Institution. *Marine Fouling and Its Prevention*. Annapolis, U. S. Naval Institute, 1952. 388p.

Explores the fundamental basis on which preventative techniques to prevent marine fouling must rest. Discusses problems of marine fouling, its biology, and prevention.

133. Zenkevitch, Lev. *Biology of the Seas of the U.S.S.R.* New York, Interscience, 1963. 955p.

Covers the history of exploration, the physical geography, the hydrology, hydrochemistry, and the flora and fauna for the northern, southern, and far eastern seas of the U.S.S.R. Gives quantitative studies of the feeding habits of fishes and similar investigations of the distribution of flora and fauna throughout the seasons which make it possible for general conclusions about biological productivity to be drawn.

134. Zoological Society of London. *Aspects of Marine Zoology*, edited by Norman B. Marshall. New York, Academic, 1967. 270p.

Provides a wide variety of papers by eminent marine zoologists in the fields of marine biology and marine zoology. Includes Chapters on the luminescence of fishes, seasonal migration of sperm whales, illustrations of oceanic neuston, and the pigments of plankton at the sea surface.

Periodicals

135. American Fisheries Society. Transactions. Lawrence Kansas. Quarterly
Publishes original articles and notes that make significant contributions to fishery research, management, and related subjects. Includes both freshwater and marine fishery studies.

136. Copeia. Official Publication of the American Society of Ichthyologists and Herpetologists. Washington, U. S. National Museum. Quarterly
Features scholarly articles covering the biology, physiology, and ecology of fish and reptiles.

137. The Biological Bulletin. Woods Hole, Mass., Marine Biological Laboratory. Bimonthly.
Prints research articles principally featuring all phases of marine biology although a few articles deal with other fields of biology.

138. Journal of Experimental Marine Biology and Ecology. Amsterdam, Netherlands, North-Holland Publishing Co. Bimonthly
Brings together papers on all aspects of marine ecology-floristic or faunistic, littoral, inshore, offshore, and deep sea. Emphasizes particularly work on the physiology, biochemistry and behavior of organisms in relation to their ecology.

139. Journal of Fish Biology. New York, Academic Press. Quarterly
Presents studies on all aspects of fish and fishery science. Features original research on any subject relevant to the central theme of fish biology, both marine and freshwater.

140. Journal of the Fisheries Board of Canada. Ottawa, Canada. Monthly
Devoted to original research papers and notes concerning aquatic organisms or environments relevant to Canada. Publishes review articles also if they are timely, critical appraisals of the state of knowledge in broad areas of research.

141. Revue Internationale d'Oceanographie Medicale. Nice, France, Centre d' Etudes et de Recherches de Biologie et d'Oceanographie Medicale. Irregular
Publishes research articles in the field of oceanographic medicine, such as the antibiotic capacity of sea water, studies of ciguatera, and the results of microbiological and chemical researches performed on the conditions of the Northern Adriatic Sea marine environment. Most articles are in French with an English summary, but a few are in English with a French summary.

142. Marine Biology. An International Journal of Life on Oceans and Coastal Waters. Berlin, Germany, Springer-Verlag. Irregular

Features research articles in marine zoology including fisheries, marine botany, and marine microbiology. Areas of particular interest are ecological dynamics, experimental ecology, and physiology, underwater exploration and experimentation and cultivation, life histories and diseases of marine life.

143. Problems of Ichthyology. Washington, Scripta Technica, Inc., Bimonthly

Sponsored by the American Fisheries Society and a translation of the Russian journal "Voprosy Ikhtiolozii" Brings together research papers on many phases of the zoology of both marine and freshwater fishes.

144. Zoological Record. London, Eng., The Zoological Society of London. Irregular

Presents material on the taxonomy of marine organisms in this journal which is considered to be the world's authority on taxonomy. Includes a systematic index of the biological classification together with a subject and author index.

MARINE METEOROLOGY

Abstracts and Indexes

145. Meteorological and Geoastrophysical Abstracts. Boston, American Meteorological Society. Monthly

Devoted to current abstracts on important meteorological and geoastrophysical literature in every language. Divided into following sections: General, Applied Meteorology, Meteorology, Geomagnetism and Aeronomy, Astrophysics, Oceanology, Glaciology, and Hydrology. Presents special bibliographies on subjects of oceanographic and meteorologic interest. Includes author, subject, and geographical indexes.

Bibliographies

146. International Catalogue of Scientific Literature, Section F. Meteorology Including Terrestrial Magnetism. 1901-1914. London, Royal Society of London, 1902-1915. 14v. ----- Reprint. New York, Johnson Reprint Corp., 1968. 1v.

Presents bibliography of papers and books in serials and independent works in the field of meteorology. Contains schedules and indexes in four languages, an author catalog and a subject catalog.

147. U. S. Army Signal Corps. Bibliography of Meteorology. Washington, Signal Office, 1889-91. 4v.

Subtitle: A Classed Catalogue of the Printed Literature of Meteorology from the Origin of Printing to the Close of 1881; with a Supplement to the Close of 1887, and an Author Index. Prepared under the Direction of A. W. Greely...ed. by Oliver L. Farwig. v.1. Temperature; v.2. Moisture; v.3-4 Include Literature to 1889.

148. U. S. Department of Commerce. Environmental Science Services Administration. ESSA Libraries Holdings in Oceanography and Marine Meteorology, 1910-1967. Rockville, Md., Environmental Science Services Administration, 1969. 4v.

v. 1. Bibliography; v.2. Author and Subject Indexes; v. 3. Systematic Indexes; v.4. Keyword (KWIC) Index. Includes more than a thousand references in oceanography, marine meteorology, and related subjects.

Dictionaries, Encyclopedias, Glossaries

149. Fairbridge, Rhodes W., ed. *The Encyclopedia of Atmospheric Sciences and Astrogeology*. New York, Reinhold, 1967. 1200p.

Gives background information in both the earth and the space sciences in a series of articles mostly with bibliographies. Included are articles on the antarctic ice budget, the carbon dioxide cycle in the sea and atmosphere, ocean-atmosphere interaction and marine climatology.

150. *Glossary of Meteorology*, edited by Ralph E. Huschke. Boston, American Meteorological Society, 1963. 638p.

Contains entries defining words and phrases stemming from meteorology, hydrology, oceanography, geomagnetism, and astrophysics. Includes technical information together with the pertinent mathematics.

151. Great Britain. Meteorological Office. *Meteorological Glossary*, compiled by D. H. McIntosh. 4th ed. London, Eng., Stationery Office, 1963. 287p.

Contains a brief definition of terms in ordinary use rather than a compilation of miscellaneous articles. Defines and discusses about fifteen hundred technical terms used in meteorology.

Handbooks

152. Berry, Frederic A. and others. *Handbook of Meteorology*. New York, McGraw-Hill, 1945. 1068p.

Designed as a convenient text reference for data, fundamental theory, and weather analysis and forecasting. Emphasizes the scientific and engineering aspects of meteorology.

153. Smithsonian Meteorological Tables. 6th rev. ed. Washington, Smithsonian Institution, 1951. 537p. (Smithsonian Miscellaneous Collections 114)

Consists of the following tables: Section I. Conversion Tables. Section II. Wind and Dynamical Tables. Section III. Barometric and Hypometric Tables. Section IV. Geopotential and Aerological Tables. Section V. Standard Atmosphere and Altimetry Tables. Section VI. Thermodynamic Tables. Section VII. Hygrometric and Psychrometric Tables. Section VIII. Tables of Miscellaneous Physical Properties of Air and Airborne Particles. Section IX. Tables of Miscellaneous Properties of Water Substances and Soils. Section X. Radiation and Visibility Tables. Section XI. Geodetic and Astronomical Tables.

154. U. S. Committee on Extension to the Standard Atmosphere, 1962. U.S. Standard Atmosphere, 1962: ICAO Standard Atmosphere to 20 Kilometers; Proposes ICAO Extension to 32 Kilometers. Tables and Data to 700 Kilometers. Washington, Government Printing Office, 1962. 278p.

Gives in Part I the basis for the main tables of atmospheric properties. Contains in Part II a discussion of systematic variations, observed and inferred extremes, and representatives of atmospheric variables as approximate analytic functions of altitude. Concludes in Part III with the main tables of atmospheric properties to seven hundred kilometers calculated in both metric and English units.

Monographs

155. Bolin, Bert, ed. The Atmosphere and Sea in Motion; Scientific Contributions to the Rossby Memorial Volume. New York, The Rockefeller Institute Press, 1959. 509p.

Presents an appraisal of the dominant problems of meteorology, including marine meteorology. Includes sections on current problems in meteorology, the sea in motion, distribution of matter in the sea and atmosphere, the general circulation of the atmosphere, characteristics of atmospheric motion, and weather forecasting.

156. Dunn, William L. Meteorology. 3rd. ed. New York, McGraw-Hill, 1965. 484p.

Emphasizes the maritime aspects of meteorology in addition to the conventional study of meteorological principles. Includes Chapters on "Weather at Sea" and "The Oceans" and presents a non-mathematical treatment of the subject.

157. Dunn, Gordon E. and Banner I. Miller. Atlantic Hurricanes. Baton Rouge, La., Louisiana State University Press, 1964. 377p.

Discusses the climatology, the physical processes in the formation, intensification and dissipation of hurricanes and methods of their forecasting and tracking. Concludes with Chapters on hurricane hazards by regions and recent advances in hurricane research such as satellite meteorology and hurricane control.

158. Great Britain. Meteorological Office. Meteorology for Mariners with a Section on Oceanography. London, Eng., Stationery Office, 1967, 304p.

Defines the theory of modern meteorology in a way that is suitable to mariners and explains its practical application aboard ship. Chapters on ocean currents and ice emphasize their bearing on safety at sea.

159. Harding, Edwin T. and William J. Kotzsch. Heavy Weather Guide. Milwaukee, George Banta Co., Inc. 1965. 209p.

Deals with Atlantic hurricanes in the first part of the book, with Pacific typhoons in the second, and the third consists of eight selections from the literature on such topics as the historical aspects of hurricanes, the handling of ships in tropical cyclones and personal impressions of tropical cyclones including an excerpt from Joseph Conrad's "Typhoon".

160. Ropi, H. U. Physics of the Marine Atmosphere. New York, Academic Press, 1965. 426p.

Presents observations and measurements at sea, the composition and properties of the marine atmosphere, and the flow characteristics and thermodynamic processes of the marine atmosphere.

161. Sverdrup, H. U. Oceanography for Meteorologists. New York, Prentice-Hall, 1942. 246p.

Deals with the aspects of physical oceanography that have a bearing upon the problems of the atmosphere. Emphasizes the temperature, the salinity, the currents of the upper layers of the oceans and the factors that control existing conditions.

162. U. S. Weather Bureau. U. S. Navy Marine Climatic Atlas of the World. Washington, Naval Chief of Operations, 1955-1969. 8v.

Summarizes the meteorological information for surface and upper air over the oceans of the world in the form of monthly charts. V. 1. North Atlantic Ocean; V. 2. North Pacific Ocean; V. 3. Indian Ocean; V. 4. South Atlantic Ocean; V. 5. South Pacific Ocean; V. 6. Arctic Ocean; V. 7 Antarctic; and V. 8. The World.

Periodicals

163. Atmospheric and Oceanic Physics. Izvestya Academy of Sciences, USSR. Washington, American Geophysical Union. Monthly

Publishes research articles on theoretical aspects of the atmospheric and oceanic environments which have been translated from one of the Chief Soviet journals in geophysics about three to six months after appearance of the original Russian issue.

164. Journal of Applied Meteorology. Boston, American Meteorological Society. Bi-monthly

Covers research concerned with the application of the atmospheric sciences to operational and practical goals. Of interest to marine meteorologists and physical oceanographers are articles on hurricanes and hurricane forecasting, air-sea interactions, and the forecasting of cyclones and anti-cyclones over ocean areas.

165. Journal of the Atmospheric Sciences. Boston, Mass., American Meteorological Society. Bi-monthly

Treats the quantitative and deductive aspects of the atmosphere including the theoretical aspects of marine meteorology and the interface between the ocean and the atmosphere. Includes purely instrumental papers of a highly original nature.

166. The Marine Observer; A Quarterly Journal of Maritime Meteorology Prepared by the Marine Division of the Meteorological Office. London, Eng., Stationery Office, Quarterly.

Prints articles on all phases of marine meteorology including sea state, marine life, ship routing, and general weather conditions, particularly in the Eastern North Atlantic.

167. Monthly Weather Review. Washington, Government Printing Office. Monthly

Presents research papers on both synoptic and dynamic meteorology together with a monthly summary of the weather and circulation on a hemispheric basis. Of interest to marine meteorologists are articles on tropical storms and storm surges, marine weather forecasting and optimum ship routing.

168. Quarterly Journal of the Royal Meteorological Society. London, Eng., Royal Meteorological Society. Quarterly

Publishes results and reports of original research and reports of the Society's scientific meetings. Brings together scholarly articles in marine meteorology, physical oceanography, and air-sea interactions as well as the traditional fields of meteorology.

OCEAN ENGINEERING

Abstracts

169. Ocean Research Index: A Guide to Ocean and Freshwater Research including Fisheries Research. Guernsey, British Isles, Francis Hodgson, 1970. 507p.

Contains information on organizations throughout the world which promote, conduct or encourage research in marine and freshwater science and related fields. Indicates the area of research interests of each organization rather than the work of individual scientists or the scope of particular research projects which may be of short duration.

170. Sinha, Evelyn. Oceanic Abstracts. La Jolla, Calif., Oceanic Library and Information Center, 1960-67. 2v.

Presents an annotated bibliography on oceanic instrumentation including instruments used in observation, measurement, sampling or collecting data from in, on or above the sea. Covers instruments used in making observations from aircraft or from satellites as well as support equipment or systems essential to their safe and effective operation.

171. Underwater Science and Technology Information Bulletin. Guildford, Eng., Iliffe Science and Technology Publications, Ltd.

Reviews all aspects of applied research and development in the underwater environment. Contains two sections - a Citation section and one on patent abstracts. Lists in the citations references to all published articles, papers and reports that have technological significance. Provides basic bibliographic information needed to locate the article together with selected keywords. Gives no abstracts.

Handbooks

172. Handbook of Ocean and Underwater Engineering, edited by J. J. Myers and others. New York, Inc., McGraw, 1969. 1070p.

Emphasizes the design of equipment, systems or structures for use in the ocean environment and methods involved in their installation. Includes among the areas discussed basic oceanography, underwater fields and instrumentation, underwater cables, vessels and floating platforms and tools, rigging and machinery for ocean operations.

Monographs

173. Abkowitz, Martin A. *Stability and Motion Control of Ocean Vehicles*. Cambridge, Mass., Massachusetts Institute of Technology Press, 1969. 1v.

Studies and applies the hydrodynamic principles involved in the design of vehicles and systems for use in the ocean. Determines how ocean vehicles or systems respond to the ocean environment and whether such vehicles can be expected to operate properly in this environment.

174. American Society for Testing and Materials. *Materials Performance and the Deep Sea*. A Symposium presented at the Seventy-first Annual Meeting, American Society for Testing and Materials San Francisco, Calif., 23-29 June, 1968. Philadelphia, Pa., American Society for Testing and Materials, 1969. 146p.

Summarizes the results of scientific engineering, and test work on materials to be used in a deep sea environment. Considers the effect of seawater on steel and aluminum alloys, deterioration of wood by marine fungi, and the effect of external hydrostatic pressure on damage to glass hydrosphere.

175. Brahtz, John F., ed. *Ocean Engineering: Goals, Environment, Technology*. New York, Wiley, 1963. 720p.

Indicates planning opportunities for matching socioeconomic, civil, and military needs in Part I. In Part II, extends the benefits of systems methodology for ocean engineering to include both planning and design.

176. Bretschneider, Charles L., ed. *Topics in Ocean Engineering*. Houston, Tex., Gulf Publishing Co., 1969 +, v. 1 +.

Discusses techniques and procedures in port and coastal engineering. Also deals with offshore continental shelf and deep ocean engineering.

177. Evans, J. Harvey and John C. Adamchak. *Ocean Engineering Structures*. Cambridge, Mass., Massachusetts Institute of Technology Press, 1969. 1v.

Groups ocean engineering structures treated as line structures, surface platforms, and submarine pressure vessels. Discusses deep ocean environment, seaway structural loading, shell analysis and design, subsurface habitations and salvage, and emplacement operations. Concludes with an extensive bibliography.

178. Hersey, John Brackett, ed. Deep Sea Photography. Baltimore, Johns Hopkins Press, 1967. 310p. (The Johns Hopkins Oceanographic Studies No. 3)

Explores the use of photography as a tool for the scientific study of the deep sea. Reviews some history and describes technical design and special applications, followed by contributions illustrating the uses of deep sea photography, such as in the study of processes and structures of the ocean floor and in the study of marine animal life.

179. Instrument Society of America. Marine Sciences Instrumentation. New York, Plenum, 1962 +, v.1 +

Presents the proceedings of annual symposia on the advances in the field of oceanographic instrumentation. Describes and discusses the testing design, and evaluation of all varieties of measuring devices from thermometers to echosounders, from plankton sampling devices to remote handling techniques, and from the underwater photography to the porpoise as an oceanographic research tool.

180. Lawrence, L. George. Electronics in Oceanography. Indianapolis, Ind., Howard W. Sams and Co., 1967. 288p.

Examines electronic apparatus for use in the measurement of salinity, temperature, pressure, light and other oceanographic parameters. Includes also Chapters on electronic sound navigation ranging, surface ranging and navigation, and electricity and marine animals.

181. Mandel, Philip. Water, Air and Interface Vehicles. Cambridge, Mass., Massachusetts Institute of Technology Press, 1969. iv.

Treats airborne and waterborne vehicles on a common basis and considers as well, vehicles like hydrofoil Craft, air cushion vehicles, and planing Craft which, like surface ships, operate at the interface between air and water. Covers topics such as vehicle support forces generation of lift drag and lift scaling laws, production of thrust, and vehicle lift/drag ratios.

182. Marine Technology Society. Safety and Operational Guidelines for Undersea Vehicles. Washington, Marine Technology Society, 1968. iv.

Provides guidelines considered to embody the naval architecture and good engineering practice that should be used in the design, fabrication, and operation of undersea vehicles in order to achieve a reasonable degree of safety.

183. Marine Technology Society. Transactions of the Annual MTS Conference and Exhibit. Washington, Marine Technology Society, 1965 +. 1st Conf. +

1st Conference. Ocean Science and Engineering. 1965
2 v. 2nd Conference. Exploiting the Oceans. 1966
2 v. 3rd Conference. A new Thrust Seaward. 1967 717p.
4th Conference. A Critical Look at Marine Technology. 1968. 731p.

184. Sinha, Evelyn. Oceanic Patents; 1959-1968. La Jolla, Calif., Ocean Engineering Information Service, 1969. 90p. (Ocean Engineering Information Series v. 1)

Presents a subject arrangement of patents relating to the engineering aspects, the instruments, and other equipment necessary to carrying on oceanographic programs. Gives the title, the patent holder, and number of the patent for each patent listed.

185. Terry, Richard D. The Deep Submersible. North Hollywood, Calif., Western Periodicals Co., 1966. 456p.

Describes the salient features of manned submersibles. Considers the basic principles of deep submersibles, the status of the Russian deep submersible program, and the uses of deep submersibles.

186. Terry, Richard D. Ocean Engineering. North Hollywood, Calif., Western Periodicals Co., 1966 4v.

v. 1. Pt. 1. Data Collection and Processing and Modernization of Present Equipment. Pt. 2. Reporting, Warning, and Protective Services. v. 2. Pt. 1. Communications. Pt. 2 Navigation. v. 3. Pt. 1. Energy Sources and Energy Conversion. Waste Conversion and Disposal. Pt. 2. Undersea Construction, Habitation, and Vehicles Recreation. v. 4. Pt. 1. Mineral Exploitation. Pt. 2. Fisheries, Biology.

187. Wiegel, Robert L. Oceanographical Engineering. Englewood Cliffs, N.J., Prentice-Hall, 1964. 532p.

Applies the problems of oceanography to the problems of civil engineering through the building of better port facilities and ocean structures. Covers wave theory and forces, tides, currents, the design of floating structures, seawalls, and moorings for ships.

Periodicals

188. *Hydrospace; Marine Technology & Oceanics Management*. Bromley, England, Spearhead Publications, Ltd. Bimonthly
Presents material reflecting the problem areas and marketing needs in world oceanics. Emphasizes articles of interest to both ocean scientists and ocean-related industry.

189. *Marine Technology Journal*. Washington, Marine Technology Society. Bimonthly
Publishes papers, review articles, short technical notes in any field of marine sciences and technology. Also includes current ocean abstracts, book reviews, and notices of meeting of marine science interest.

190. *Ocean Engineering ; An International Journal*. London, Eng., Pergamon Press. Bimonthly
Emphasizes the design, construction, and operation of submersible vehicles and laboratories. Also presents articles on the design and construction of structures on the ocean bottom and on coastal engineering.

191. *Ocean Industry*. Houston, Tex., Gulf Publishing Co. Monthly
Reports and analyzes the foreign and domestic developments in the world's news of interest to oceanographic industry. Emphasizes ocean engineering, oceanography as it affects ships and shipping, and oil pollution of the ocean.

192. *Ocean Science News*. Washington, Nautilus Press Inc. Weekly
Provides news on the political aspects of oceanography and the personalities affecting them. Discusses activities and persons in the industrial sector and lists contract awards for oceanographic study and research.

193. *Oceanic Instrumentation Reporter*. La Jolla, Calif., Ocean Engineering Information Service. Monthly
Lists patents of oceanographic interest by title of patent, patent holder, number of patent, and assignee.

194. *Oceanology. The Weekly of Ocean Technology*. Washington, American Aviation Publications, Inc. weekly
Prints news items on the scientific, political, and technological

happenings in oceanology. Covers also meetings of marine science interest and activities of people concerned in the field.

195. Oceanology International. Beverly Shores, Ind., Industrial Research Publications Co., Bimonthly

Emphasizes news of both foreign and domestic ocean science interest and state-of-the-art articles which examine the industrial and engineering aspects of oceanography in a nontechnical manner.

196. Under Sea Technology; The Industry's Recognized Authority for Oceanography, Marine Sciences, and Undersea Defense. Arlington, Va., Compass Publications, Inc. Monthly

Features non-technical articles on ocean engineering aspects of the marine sciences, such as the deep submersible, seismic exploration, and careers in ocean engineering. Discusses international and domestic news of oceanographic interest.

197. Underwater Science and Technology Journal. Guildford, Eng., Iliffe Science and Technology Publications, Ltd. Quarterly

Includes surveys of an interdisciplinary nature, reviews and assessments of underwater equipment and instrumentation, and descriptions of design and development projects. Also publishes contributions such as case histories, instructional and introductory articles, interpretative articles and accounts of developments in practical terms.

CHEMICAL OCEANOGRAPHY

Abstracts and Indexes

198. Chemical Abstracts; Key to the World's Chemical Literature. Easton, Pa., American Chemical Society. Weekly

Provides abstracts of all scientific and technical papers containing new information of chemical and engineering interest and reports new chemical information revealed in the patent literature. Is divided into five subject areas: 1. Biochemistry. 2. Organic Chemistry. 3. Macromolecular Chemistry. 4. Applied Chemistry and Chemical Engineering. 5. Physical and Analytical Chemistry. Each item contains basic bibliographical information in addition to an abstract. Provides keyword subject, numerical patent, patent concordance and author indexes with each issue. Issues cumulative indexes every five years.

199. Water Pollution Abstracts. London, Eng., Her Majesty's Stationary Office. Monthly

Publishes abstracts of literature dealing with various types of water pollution in the broad fields of conservation of water resources, analysis of water and wastes, effects of pollution including oil pollution effects on marine biological life and other related subjects. Each entry contains complete bibliographic information together with an abstract with indexes issued annually.

Dictionaries, Encyclopedias, Thesauri

200. The Encyclopedia of Chemistry, ed. by George L. Clark and Gessner G. Hawley. 2nd. ed. New York, Reinhold, 1966. 1143p.

Presents an alphabetical arrangement of signed articles with bibliographies on analytical, organic, physical, biological, engineering, colloid, and other branches of chemistry. Summarizes other related sciences, such as potentiometry, metrology, metallurgy, and bacteriology from the viewpoint of chemistry and also includes brief biographies of outstanding figures in past chemical achievement and information on research institutions.

201. The Encyclopedia of the Chemical Elements, edited by Clifford A. Hampel. New York, Reinhold, 1968. 849 p.

Brings together material on the discovery and history of each

element, and its biological and biochemical nature, including toxicological factors.

202. Hackh's Chemical Dictionary (American and British Usage) containing the Words Generally Used in the Related Sciences of Physics, Astrophysics, Mineralogy, Pharmacy, Agriculture, Biology, Medicine, Engineering, etc. Based on Recent Chemical Literature, rev. and edited by Julius Grant. 4th ed. New York, McGraw, 1969. 738p.

States the theories, laws, and rules of chemistry, describes the elements, compounds, minerals, drugs, vegetable and animal products, lists important reactions, processes and methods, mentions the chemical apparatus, equipment and instruments, and notes the names of the investigators who have built up the science.

203. Mellon, Melvin Guy. Chemical Publications, Their Nature and Use. 4th ed. New York, McGraw, 1965. 324p.

Provides a current perspective of chemical literature and chemical documentation. Describes primary sources, such as periodicals and literature on patents, secondary sources, including monographs and textbooks, and bibliographies, and tertiary sources, consisting of guides and directories.

Handbooks

204. Handbook of Chemistry and Physics: A Ready-Reference Book of Chemical and Physical Data, edited by Robert C. Weast, 50th ed. Cleveland, The Chemical Rubber Co. 1969. 1v.

Contains information in chemistry and physics in addition to selected sciences. Includes the following sections: Section A. Mathematical Tables. B. Elements and Inorganic Compounds. Section C. Organic Compounds. Section D. General Chemical. Section E. General Physical Constants. Section F. Miscellaneous.

205. Lange, Norbert Adolph and Gordon M. Forker, Comp. and ed. Handbook of Chemistry; A Ready Reference Volume for All Requiring Ready Access to Chemical and Physical Data. Used in Laboratory Work and Manufacturing. 10th rev. ed. New York, McGraw-Hill, 1967. 2001p.

Includes sections on fire and life hazards, chemical and physical properties of classified substances, miscellaneous tables of specific properties, and conversion factors and numerical tables.

Monographs

206. Canada. Fisheries Research Board. *A Practical Handbook of Sea Water Analysis*, by J. D. H. Strickland and T. R. Parsons. Ottawa, Queen's Printer, 1968. 311p.

Gives full working instructions of methods of sea water analysis. Most of the methods described are for substances that measure organic production in the sea and the analysis for transitional and "rare" metallic elements are not comprehensively treated. Provides a brief outline for the automation of sea water analysis.

207. Harvey, H. W. *Chemistry and the Fertility of Sea Water*. Cambridge, University Press, 1967. 234p.

Deals with the environment of the flora and fauna of the sea, including changes in composition of sea water due to plants and animals, changes due to bacteria, and factors influencing the growth of plants. Also treated are the major and minor constituents of sea water, the carbon dioxide system, and dissolved oxygen, nitrogen, and inert gases in sea water.

208. Hill, M. N., ed. *The Sea: Ideas and Observations on Progress in the Study of the Seas*. v.2. *The Composition of Sea Water; Comparative and Descriptive Oceanography*. New York, Interscience, 1963. 554p.

Brings together a series of articles on various aspects of chemical oceanography and comparative and descriptive oceanography. Considers the topics of the chemistry of sea water, the fertility of the oceans, ocean currents, biological oceanography, and oceanographic miscellanea.

209. Horne, R. A. *Marine Chemistry: The Structure of Water and the Chemistry of the Hydrosphere*. New York, Wiley, 1969. 568p.

Examines the fundamental physical-chemical properties which are responsible for the chemical composition and properties of sea water. Also discusses the processes involved in the chemical interactions of the sea with its atmospheric and lithospheric boundaries.

210. Martin, Dean F. *Marine Chemistry*. New York, Marcel Dekker, Inc., 1968. 2v.

v. 1. *Analytical Methods*. Contains a discussion of current laboratory procedures and reviews the commonly used determinations of marine chemistry. v. 2. *Theory*. Provides a comprehensive discussion on the theoretical aspects of marine chemistry.

211. Riley, John P. and G. Skirrow, eds. Chemical Oceanography. V. 1. New York, Academic, 1965. 712p.

Discusses the chemistry of the sea, the interaction between the components of sea water, and the geochemistry of marine substances. Includes chapters on currents and mixing in the ocean, the physical properties of sea water, major and minor constituents of sea water, and the production of organic matter in the primary stages of the marine food chain.

212. Rogers, T. Howard. Marine Corrosion. London, Newnes, 1968. 307p.

Provides an approach to the marine corrosion problems of the shipbuilding and marine industries which is largely practical but which does not entirely omit theoretical considerations. Discusses the working of the complex corrosion cell in detail and the corrosion of aluminum, copper, ferrous metals and alloys, and wood. Describes various types of protection against corrosion.

213. Smith, J. E., ed. Torrey Canyon Pollution and Marine Life. A Report by the Plymouth Laboratory of the Marine Biological Association of the United Kingdom. Cambridge, At the University Press 1968. 196p.

Surveys and analyzes some biological consequences resulting from the release of crude oil from the tanker "Torrey Canyon." Describes in detail the effect of the detergents which were used to disperse the oil at sea on marine plants and animals.

214. Spiegel, K. S., ed. Principles of Desalinization. New York, Academic, 1966. 566p.

Examines the principles of the developing technology of large-scale desalting. Attempts to survey critically the fundamentals of the major desalting methods now in use and to extract from the literature the basic scientific and design principles which underlie the methods.

MARINE GEOLOGY

Abstracts and Indexes

215. Abstracts of North American Geology. Washington, Government Printing Office. Monthly

Contains abstracts of technical papers and books and citations of maps on the geology of North America including Greenland, the West Indies, as well as the State of Hawaii, Guam and other island possessions of the United States. Cites articles of a general nature by North American author, although published in foreign journals. Lists materials alphabetically by author with subject indexes in each issue. Publishes no annual indexes.

216. Bibliography and Index of Geology Exclusive of North America. (Title changed to Bibliography and Index of Geology with v. 33, 1969). Boulder, Colo., The Geological Society of America. Monthly.

Covers the literature on the geology of South America, Europe, Asia, Africa, Australia, Iceland, Antarctica, and islands of the eastern Atlantic and Pacific Ocean basins. The monthly issues are divided into fields of interests containing twenty two interdisciplinary categories. Each issue contains a subject and author index and a cumulative annual subject index is issued.

217. Bibliography of North American Geology. Washington, Government Printing Office. Annually

Lists the publications which have appeared during that year concerning the geology of the North American continent, Greenland, the West Indies and adjacent island possessions but not trust territories of the U. S. Cites articles by North American authors published in foreign journals if they deal with North American localities or are of a general nature. Arranged by author and gives the basic bibliographic information necessary to locate the publication. Includes a subject index containing geographical place names in each issue.

218. Geological Abstracts. New York, The Geological Society of America. 1953-1958.

Abstracts from selected geological journal. Groups these abstracts by the journal in which they appeared and uses the author's abstract, if possible. Each issue contains an author index, but provides no subject index for each issue. A cumulative subject

index appears in the final issue of each volume. This abstracting service ended in 1958 and was replaced by Geophysical Abstracts.

219. **Geophysical Abstracts.** Washington, Government Printing Office. Monthly

Replaces Geological Abstracts. Presents abstracts of current literature pertaining to the physics of the solid earth and geophysical exploration. Includes topics of interest to marine scientists such as submarine geology, magnetic surveys, heat and heat flow, and earthquakes. Provides basic bibliographic coverage in addition to the abstract with each entry with a subject and an author index in each issue. Includes no foreign material except translated Russian material.

220. **Geoscience Abstracts.** Washington, American Geological Institute.

Covers significant literature in geology, solid earth geophysics, and related areas of science, which has been published in North America, or if published elsewhere deals with North America. Subject fields of interest to the marine geologist include geomorphology, geochemistry, geohydrology, and mineral deposits. Provides an author index and an annual subject and author index.

Bibliographies

221. **International Catalogue of Scientific Literature.** Section H. Geology. 1901-1914. London, The Royal Society, 1902-1915. 14v. ----- Reprint. New York, Johnson Reprint Corp., 1968. 1v.

Provides a bibliography of papers and books in serials and independent works in the field of geology. Contains schedules and indexes in four languages, an author catalog, and a subject catalog.

222. **Catalogs of the United States Geological Survey Library.** Department of the Interior. Boston, G. K. Hall and Co., 19- 25v.

Comprises the largest geological collection in the world. Possesses as complete as possible acquisitions in geology, paleontology, petrology, ground and surface water, cartography, and mineral resources. Has a strong collection in oceanography, botany, physics, and zoology.

223. **Monaco, Institute Oceanographique and U. S. National Oceanographic Data Center. Bibliography on Marine Seismics,** by Olivier Leenhardt

Washington, American Meteorological Society, 1967. (American Meteorological Society. Special Bibliographies on Oceanography, Contribution no. 3)

Brings together a bibliography of literature on the use of controlled elastic emissions for the purpose of studying the submerged sea bottom and sub-bottom. Lists only by author with no title index.

Dictionaries, Encyclopedias, Thesauri

224. American Geological Institute. Glossary of Geology and Related Sciences. Washington, National Research Council, 1957. 325p. (National Research Council. Publication no. 501. Supplement, 1961)

Attempts to furnish the original definition of each term, wherever possible; earliest available definition, if original is not known, variant usages and spelling, current usage, and synonyms.

225. Challinor, John. A Dictionary of Geology. 3rd. ed. New York, Oxford University Press, 1967. 298p.

Presents a critical and historical review of geological terms. Gives quotations and historical review of many of the terms in order to define the term, to give a representative use of the term, or to show the term in a variety of uses.

226. The Encyclopedia of Geomorphology, ed. by Rhodes W. Fairbridge. New York, Reinhold, 1968. 1295p.

Presents an alphabetic, encyclopedic treatment of the analytic physiography of the earth's surface. Articles are signed and most conclude with a short bibliography.

Directories

227. American Geological Institute. Directory of Geoscience Departments: United States and Canada. Washington, American Geological Institute, 1966. 186p.

Section I. Part A. Lists the schools by geographic area. Part B. Alphabetic listing of departments granting degrees giving a faculty listing, graduate and undergraduate courses and requirements for a major. Section II is an alphabetic index of the twenty nine thousand faculty members in the degree-granting departments in which they are located. Section III is a listing of colleges offering some courses in geology or earth science, but do not offer a major. Section IV lists colleges and universities offering summer field courses and Section V gives selected opportunities for fellowships and financial aid.

Handbooks

228. *Handbook of Geochemistry*, edited by K. H. Wedepohl, K. H. and others. New York, Springer-Verlag, 1969. 2v.

V. 1 contains fundamental facts of geochemistry, geophysics, together with definitions, dimensions, and methods of evaluation. V. 2 presents chapters on the abundance, biogeochemistry, solubility of elements, crystal chemistry, isotopes and other geochemical properties of elements found in the earth.

Monographs

229. Brancazio, P. J. and A. G. W. Cameron, eds. *The Origin and Evolution of Atmospheres and Oceans*. New York, Wiley, 1964. 314p.

Discusses theoretical and experimental developments related to the processes responsible for production and subsequent development of planetary atmospheres and oceans. Considers the processes by which gases escape from the center of the earth to form the terrestrial oceans and atmospheres. Describes other processes that lead to alterations of the atmosphere and the atmospheres of other planets.

230. Hill, M. N., ed. *The Sea; Ideas and Observations on Progress in the Study of the Seas*. v. 3. *The Earth Beneath the Sea; History*. New York, Interscience, 1963. 963p.

Examines various aspects of marine geology including geophysical exploration, topography and structure and sedimentation. Concludes with Chapters on the origin of life, the preserved record, the paleontology of pelagic sediments, and the Pleistocene record.

231. Ippen, Arthur T. *Estuary and Coastline Hydrodynamics*. New York, McGraw-Hill, 1966. 744p.

Develops analytical concepts for a sound physical understanding of wave phenomena. Provides Chapters on coastal processes, flow and sedimentation in estuaries, and effects of tidal dynamics on both coastal and estuarine areas.

232. Keene, M. J. *Introduction to Marine Geology*. New York, Pergamon Press, 1963. 218p.

Gives an account of marine geology and marine geophysics for scientists who are not specialists in these fields. Examines the topography of the sea floor, pelagic and abyssal plain sediments, movements of the sea floor, and the structure of the ocean basins.

233. Kuenen, Philip H. *Marine Geology*. New York, Wiley, 1950. 568p.

Emphasizes both results that have been achieved and the problems to be overcome in geological search. While concentrating particularly on the East Indies, covers the formation, sources, and transport of marine sediments, coral reefs, and the sea basin.

234. Menard, Henry W. *Marine Geology of the Pacific*. New York, McGraw-Hill, 1964. 271p.

Summarizes the development and history of the Pacific Basin and the geological processes acting in the marine realm. Includes Chapters on the normal basin, the great faults, trenches, and island arcs, followed by Chapters on pelagic sediments, continental margins, and geologic history.

235. Mero, John L. *The Mineral Resources of the Sea*. New York, Elsevier, 1965. 312p.

Explores the resources of the marine beaches, sea water, the continental shelves, and of the sediments both on the deep ocean floor and below it, and outlines the technology for extracting these resources. Briefly discusses ocean mining methods and some economic and legal aspects of these methods.

236. Miller, Robert L., ed. *Papers in Marine Geology*. New York, Macmillan 1964. 531p. (Shepard Commemorative Volume).

Written by former students of F. P. Shepard, brings together papers in the fields of shore, shelf, and upper slope geology, sedimentation, and sediment transport. Considers economic oceanography, underwater sand-ridges on Georges Shoal, erosion in Scripps Submarine Canyon, and many other related subjects.

237. Richards, Adrian F., ed. *Marine Geotechnique*. Urbana, Ill., Illinois University Press, 1967. 327p.

Presents papers on the chemical and physical properties of the electrolyte-gas-solid system of the sea floor, and the response of sedimentary systems to applied static and dynamic forces. Contents are as follows: Part I. Laboratory Results and Areal Investigations. Part II. Submarine Slides, Slumps, and Slope Stability. Part III. Sampling and In-place Measurements. Part IV. Nondestructive Testing and Literature Survey.

238. Runcorn, S. K., ed. *Continental Drift*. New York, Academic Press, 1962. 338p.

Brings together discussions by eminent geologists of the geo-

physical evidence relating to horizontal movements in the earth's crust. Studies the deep-sea floor, the ocean basin evolution by sea-floor spreading, and the movement of major transcurrent faults.

239. Shepard, Francis P. *The Earth Beneath the Sea*. Baltimore, The Johns Hopkins Press, 1967. 242p.

Describes the geological forces that shape the topography of the ocean floor and relates the latest findings of underwater research to the established principles of submarine geology.

240. Shepard, Francis P. *Submarine Geology*. 2nd ed. New York, Harper, 1963. 557p.

Develops material on wave mechanics, sediment transportation, and geochemistry not included in the first edition. Devotes a section to methods and instrumentation, followed by chapters on types of shorelines and beaches, coral reefs, chemistry of sediments - including geochronologies and deep-sea stratigraphy.

241. Shepard, Francis P. and Robert F. Dill. *Submarine Canyons and Other Sea Valleys*. Chicago, Rand McNally, 1966. 381p.

Includes detailed descriptions of the best-known submarine canyons and discussions of seven other types of sea-floor valleys in this synthesis of submarine canyon explorations. Provides data on the composition of wall rock, mechanics of sea-floor sediments, and currents by means of the latest techniques and methodology in both surface and underwater investigations.

242. Wegener, Alfred L. *The Origin of Continents and Oceans*. Translated from the third German edition by J. G. A. Skirl. London, Methuen and Co., Ltd., 1924. 212p. ----- Reprint. New York, Dover, 1966. 246p.

Reviews the nature of the theory of continental drift and the basis upon which this theory rests. Develops arguments based on geology, geodesy, geophysics, paleontology, biology, and paleoclimatology.

243. Whittard, W. F. and R. Bradshaw. *Submarine Geology and Geophysics: Proceedings of the Seventeenth Symposium of the Colston Research Society held in the University of Bristol, April 5th-9th, 1965*. London, Butterworth's, 1965. 464p.

Covers in this series of papers marine geophysics and geology of many parts of the world. Discusses the geology and mineral resources of the Japanese Continental shelf, sedimentary basins in the Mediterranean Sea, the east and west fracture zones of the

North Atlantic, and the geological and geophysical structure of the northwestern Indian Ocean.

244. Zenkovich, V. P. *Processes of Coastal Development*. London, Oliver and Boyd, 1967. 738p.

Treats the shore processes of not only tidal but also non-tidal bodies of water including open oceans and enclosed seas. Presents a comprehensive review of Russian research on Coastal problems.

Periodicals

245. *The American Association of Petroleum Geologists Bulletin*. Tulsa, Okla., The American Association of Petroleum Geologists. Monthly.

Emphasizes the geology of the continental shelves and margins along the continents of the world where oil may be obtained by offshore geology and the exploration of petroleum resources in the sea among the topics of interest to geological oceanographers in this bulletin.

246. *Geochimica et Cosmochimica Acta; Journal of the Geochemical Society*. Elmsford, N. Y., Pergamon Press. Monthly

Examines the geochemistry of the marine sediments of the ocean bottom and the chemistry of the ocean waters in articles of interest to marine geologists.

247. *Chemical Geology*. Amsterdam, Netherlands, Elsevier Publishing Co. Quarterly

Publishes research in all phases relating to the chemistry of geology including marine geology and marine sediments. Papers are printed in English, French, and German with summaries in English.

248. *Geological Society of America. Bulletin*. Boulder, Colo., The Geological Society of America. Monthly

Covers all fields of geology in this bulletin. Of interest to marine scientists include those on submarine canyons, deposition of oceanic salt, and the formation of oceanic volcanic islands.

249. *Journal of Geology*. Chicago, University of Chicago Press. Bi-monthly

Publishes many articles of interest to marine geologists including ones on Continental drift and sea floor spreading, submarine geomorphology, the formation of coral reefs, and the formation of the coasts of continents in past geologic ages.

250. Marine Geology. International Journal of Marine Geology, Geochemistry and Geophysics. Amsterdam, Netherlands, Elsevier Pub. Co.
Bimonthly

Brings together reviews and original research in various phases of deepsea and shallow water geology, including sedimentology, geomorphology, and core analysis. Papers may be in English, French, or German.

251. Maritime Sediments. An Information Journal Concerning Studies in Modern and Ancient Sediments in the Atlantic Provinces and Adjacent Areas. Halifax, Nova Scotia, Maritime Sediments. Quarterly

Reports research activity in sedimentary geology in the Maritime Provinces of Canada and adjacent areas. Publishes reports, review articles, and details of current research activity in French or English.

PHYSICAL OCEANOGRAPHY

Bibliographies

252. Samuel, Parkash. *Bibliography on the Physical Oceanography of the Indian Ocean*. Boston, American Meteorological Society, 1965. 135p.

Contains references to the different aspects of the physical oceanography including temperature, density, salinity, chemical composition, waves, currents, and circulation.

253. *Collected Bibliographies on Physical Oceanography (1953-1964)*, edited by Malcolm Rigby. Washington, American Meteorological Society, 1965. 1121p.

Consists of thirteen special bibliographies comprising over thirty-six hundred abstracts of literature pertinent to various aspects of physical oceanography. Among these bibliographies are ones on the climate and oceanography of the Pacific, energy exchange ocean-atmosphere, storm surges, subsurface ocean currents, and oceanographic instruments.

Monographs

254. Albers, Vernon M. *Underwater Acoustics Handbook II*. University Park, Pa., Pennsylvania State University, 1965. 356p.

Part I deals with the nature of sound, units of measurements, and physical characteristics of seawater as related to sound transmission. Part II covers sound propagation in the sea itself, intensity fluctuations, ambient noise, and reverberation. Part III explains transducer theory and transducers of all types. Information on the design of sound projectors and receivers is given. Part IV discusses the calibration of transducers and general acoustic techniques.

255. American Association for the Advancement of Science. *Estuaries*, edited by George H. Lauff. Washington, American Association for the Advancement of Science, 1967. 757p.

Gives detailed information concerning such matters as estuarine circulation patterns, rates of exchange of materials with coastal and marine waters, and the ecology of estuarine organisms. Summarizes the present knowledge of the natural characteristics of estuaries and delineates the direction of current research efforts.

256. Bar Iey, Richard A. Oceanographic Atlas of the Pacific Ocean. Honolulu, University of Hawaii Press, 1968. lv.

Presents charts and graphs based on observations made by more than fifty thousand stations of temperature, salinity, and dissolved oxygen at various depths in the uppermost mile of water. Includes oceanographic institutes and fisheries stations in Australia, Canada, France, French Oceania, Japan and the United States as sources of data.

257. Defant, Albert. Physical Oceanography, New York, Pergamon Press, 1961. 2v.

V. 1 deals with the spatial, material, and energetical characteristics of the water envelope of the earth and the various modes of motion of seawater in the form of ocean currents. V. 2 is devoted to the periodical movements of the water masses, such as waves, tides, and related movements.

258. Fomin, L. M. The Dynamic Method of Oceanography. New York, Elsevier, 1964. 209p.

Examines the indirect method of determining currents and transports in the ocean by measurement of the density field. Emphasizes methods for selecting the best reference level and for correct interpretation of the results and dynamic topography.

259. Frederick C. Fuglister Sixtieth Anniversary Volume. London, Pergamon Press, 1969. 470p.

Assembles a collection of thirty seven research papers on physical oceanography in this memorial volume. Contains papers on salinity changes in the western North Atlantic, on the Kuroshio Current, the Sargasso Sea, the equatorial front between Peru and Galapagos, the Ekman boundary layer, and the Florida Current.

260. Fuglister, F. C. Atlantic Ocean Atlas of Temperature and Salinity Profiles and Data from the International Geophysical Year of 1957-1958. Woods Hole, Mass., Woods Hole Oceanographic Institution, 1960. 209p.

Analyzes and summarizes temperature and salinity observations made during many systematic oceanographic cruises across both the North and South Atlantic in a series of profiles in the form of charts and tables.

261. Hill, M. N. ed. The Sea: Ideas and Observations on Progress in the Study of the Sea. V. 1 Physical Oceanography. New York, Interscience, 1962. 864p.

Presents a series of articles on various aspects of physical oceanography. Includes the topics of the interchange of properties between sea and air, dynamics of ocean currents, transmission of energy, within the sea, waves, turbulence, and the physics of sea-ice.

262. Horton, J. W. Fundamentals of Sonar. Annapolis, U. S. Naval Institute, 1959. 417p.

Shows the relationship between those physical factors which are of significance in the employment of acoustic energy propagated through water. Presents these relationships in a systematic and general manner and their utility in practical problems.

263. Kinsman, Blair. Wind Waves: Their Generation and Propagation on the Ocean Surface. Englewood Cliffs, N. J., Prentice-Hall, 1965. 676p.

Outlines the basic theories of wave propagation and wave forecasting. Discusses the specification of a random sea, determination of wave spectra, and wave generation by the wind.

264. Jerlov, N. G. Optical Oceanography. New York, Elsevier, 1968. 194p.

Discusses the inherent optical properties of sea water including scattering and beam attenuation, followed by a presentation of underwater radiant energy aspects including reflection and refraction of the sea surface and the techniques of underwater light measurement. Concludes with a brief treatment of the applications of optical methods to physical oceanography and marine biology.

265. McLellan, Hugh J. Elements of Physical Oceanography. New York, Pergamon Press, 1965. 150p.

Provides a broad look at physical oceanography without treating any part exhaustively. Covers physical conditions and physical processes within the ocean, such as oceanic movements, sound and light propagation, pressure, and density effects.

266. Macmillan, D. H. Tides. New York, American Elsevier, 1966. 240p.

Demonstrates the characteristics of the semi-diurnal features underlying all tidal phenomena where ranges are substantial, using the east coast of the North Atlantic where large tidal ranges and diverse phenomena occur. Illustrates also formulae relating the natural periods of oscillation of bays and gulfs to the oceanic pulses where resonance occurs.

267. Neuman, Gerhard and Willard J. Pierson, Jr. *Principles of Physical Oceanography*. Englewood Cliffs, N. J., Prentice-Hall, 1966. 545p.

Provides both a modern text for students and a reference book for geophysicists and for scientists from other areas by balancing between theoretical considerations and a popularized approach to physical oceanographic processes. Explores areas of current controversy and the unsolved problems in oceanography.

268. Neuman, Gerhard. *Ocean Currents*. New York, Elsevier, 1968. 352p.

Answers the questions of what ocean currents are and how they can be measured, represented, and explained. Includes chapters on observations and methods of current measurements, presentation of ocean currents and water-mass transports, major types of ocean currents, and the general circulation of the oceans.

269. Pickard, G. L. *Descriptive Physical Oceanography*. New York, Macmillan, 1964. 199p.

Emphasizes the synoptic or descriptive aspects of physical oceanography in a non-mathematical treatment. Describes the ocean basins and something of their topography, briefly followed by a treatment of the properties of seawater, the heat budget of the oceans, and oceanographic instruments. After this there is a discussion of water characteristics and the currents of the individual oceans and the book concludes with the presentation of the state of knowledge in descriptive physical oceanography.

270. Stommel, Henry. *The Gulf Stream: A Physical and Dynamic Description*. 2nd. ed. Berkeley, University of California Press, 1965. 248p.

Explains and describes the facts and theories concerning the Gulf Stream. Includes discussions of the hydrography of the Gulf Stream, nonlinear theories of the Gulf Stream, meanders in the stream, and the role of the thermohaline circulation written in a highly technical manner.

271. Tolstoy, Ivan and C. S. Clay. *Ocean Acoustics: Theory and Equipment in Underwater Sound*. New York, McGraw-Hill, 1966. 345p.

Compares the theory of sound propagation in the ocean, where possible, with experimental evidence. Presents chapters on basic wave theory, propagation of sound in both shallow and deep water, and measurements in the oceans as a problem in filter theory.

272. Frick, R. J. *Principles of Underwater Sound for Engineers*. New York, McGraw-Hill, 1967. 342p.

Summarizes the principles of underwater sound from the point of view of the engineer and practical scientist. Provides an outline of the principles, effects, and phenomena of underwater sound and gives numerical quantitative data, wherever possible, for the solution of practical problems.

273. U. S. Naval Oceanographic Office. *Practical Methods for Observing and Forecasting Ocean Waves by Means of Wave Spectra and Statistics*, by W. J. Pierson, Jr. and others. Washington, U. S. Naval Oceanographic Office, 1955. 284p.

Describes a statistical method in which the wave spectrum is computed from the predicted wind field, and the individual wave characteristics determined by use of graphic methods or simple formulas. Allows for a complete description of the sea surface.

274. Von Arx, William J. *Introduction to Physical Oceanography*. Reading, Mass., Addison-Wesley Publishing Co., 1962. 422p.

Presents a basic introduction to the science of physical oceanography. Treats various physical concepts and theories of geology, tides, waves and currents, characteristics of sea water, and advective and convective processes.

Periodicals

275. *Applied Optics*; A Monthly Publication of the Optical Society of America. Easton, Pa., American Institute of Physics. Monthly

Emphasizes applications of the facts, principles, and methods of optics to various scientific disciplines, including the marine sciences. Presents articles on the optical properties of sea water, optical instruments for underwater use, and principles of optics relating to the propagation of light and other radiation in the oceans.

276. *Journal of the Acoustical Society of America*. Lancaster, Pa., American Institute of Physics. Monthly

Publishes original research articles in many fields of acoustics including underwater sound, ultrasonics, and acoustical apparatus and instruments. Also reported are acoustical news from the United States and abroad and reviews of current publications in acoustics.

277. Journal of Physical Oceanography. Boston, American Meteorological Society. Quarterly

Devoted to research in the physics and chemistry of the oceans and the processes coupling the sea to the atmosphere. Examines both the observational and theoretical aspects of the field.

278. Journal of the Optical Society of America. New York, American Institute of Physics. Monthly

Reports experimental and theoretical investigations which contribute new knowledge or understanding to any optical phenomena, principle, or method including spectroscopy, color vision, and colorimetry. Many articles present studies of oceanographic interest.

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13. ABSTRACT

A bibliography of technical oceanographic literature covering the fields of general oceanography, marine biology, marine meteorology, ocean engineering, chemical oceanography, marine geology, and physical oceanography has been compiled and annotated. An attempt has been made to present a representative guide to both the classic literature of oceanography and a selective coverage of the most recent publications in the field.

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